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## The impact of conditioning and pelleting on the hygienic status of sunflower meal

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**Abstract** The hygienic status of feed is the important quality and safety characteristics. It could be influenced by microbiological contamination of raw materials besides by upgrowth of microorganism such as bacteria, yeasts and molds in animal feed during storage periods. According to some investigation 90% Salmonella in feed is caused by contaminated raw materials. Oil seed meal and animal derived protein were identified as major risk feed materials for introducing Salmonella contamination to feed mills and industrial compound feed. Real-time control of microorganisms in raw materials is not applicable for feed manufactures. Therefore, preventive technology with defined decontamination effect must be recommended. Several treatment procedures for microbiological decontamination of feed ingredients are available. Heat treatments are generally recognized as the most effective decontamination methods. Hydrothermal and hydrothermal mechanical processes, like as steam conditioning and pelleting are well known to be effective processing procedures that can significantly reduce Salmonella and destroyed or reduces the content of other microorganisms. The efficiency of these heat treatments on destruction or reduction of microorganisms in feed are affected by a number of factors or parameters. Besides processing parameters like as temperature, retention time etc. it largely depend on the composition of the feed and the level of contamination. Thus time/temperature requirements must be determined for each of the processing methods based on specific matrix and the level of contamination. The current study was designed to investigate the influence of steam conditioning and subsequent pelleting conditions on reducing micro organisms counts in sunflower meal.

The investigation was performed in pilot plant equipment. Sunflower meals were heated to a temperature of 70 - 85 °C by the addition of steam. The heated material is then retained in mixer/conditioner and retention time was varied from 2 to 10 minutes. After conditioning sunflower meal was pelleted. Temperature of pelleting material was elevated from 70 to 90o C. Examined samples were with higher and lower initial microorganisms content.

Elimination of Salmonella, an essential hygiene requirement, was achieved by exposure to temperature of 80o C for four minutes in the samples with lower initial contamination (160 000cfu/g and for eight minutes in the samples with higher initial contamination (2 300 000 cfu/g) of sunflower meal. During so designed processes the total number of microorganisms was reduced to the level less than 10 000 cfu/g in both examined sunflower meals. Similar results were achieved by conditioning at 85o C without added retention time in the samples with lower initial contamination and after four minutes retention time in the samples with

higher initial contamination. The moisture before conditioning was about 14% in all examined samples.

Pelleting has an effect on the hygienic status of the sunflower meal but short term conditioning, without added retention time, alone or in combination with pelleting was not sufficient for decontamination of samples with higher initial contamination. Reduction of total micro-organisms count up to log3 and elimination of pathogenic micro-organisms such as Salmonella, moulds etc. were achieved by exposure to conditioning temperature of 80o C with minimum retention times of four minutes and by pelleting at 85o C.

It can be concluded that the hygienic status of sunflower meal can be improved by increasing temperature and the treatment time.

**Keywords** hygienic status;sunflower meal;conditioning;pelleting, retention time;temperature

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